

CLAIMS

1. A process for producing anatase titanium oxide, comprising the steps of:

heat treating a titania sol solution, a titania gel, or a titania sol-gel mixture in a closed vessel under pressure, said titania sol solution, titania gel, or titania sol-gel mixture containing as a solvent an alcohol having a structure represented by formula $C_nH_{2n+1}OH$; and

then drying the treated product to prepare anatase titanium oxide powder.

2. A process for producing anatase titanium oxide, comprising the steps of:

heat treating a titania sol solution, a titania gel, or a titania sol-gel mixture in a closed vessel under pressure, said titania sol solution, titania gel, or titania sol-gel mixture containing as a solvent an alcohol having a structure represented by formula $C_nH_{2n+1}OH$; and

then ultrasonically dispersing or stirring the treated product to prepare anatase titanium oxide slurry.

3. The process for producing anatase titanium oxide according to claim 1 or 2, wherein the titania sol solution, the titania gel, or the titania sol-gel mixture is heat treated in the temperature range of 80 to 250°C in the closed vessel.

4. The process for producing anatase titanium oxide according to any one of claims 1 to 3, wherein the titania sol solution, the titania gel, or the titania sol-gel mixture is heat treated in the closed vessel under a pressure of 1.5 to 350 atm.

5. The process for producing anatase titanium oxide according to any one of claims 1 to 4, wherein the contents of the closed vessel are heated to evaporate the solvent contained in the titania sol solution, the titania gel, or the titania sol-gel mixture, whereby the inside of the closed vessel is pressurized by gas generated as a result of the evaporation of the solvent.

6. The process for producing anatase titanium oxide according to any one of claims 1 to 5, wherein inert gas is

introduced into the closed vessel to pressurize the inside of the closed vessel.

7. The process for producing anatase titanium oxide according to any one of claims 1 to 6, wherein at least one member selected from the group consisting of acidic materials, alkaline materials, organic polymers, and inorganic materials is added to the titania sol solution, the titania gel, or the titania sol-gel mixture.

*SUV
AI*
~~8. A process for producing anatase titanium oxide, comprising the steps of:~~

~~heat treating a substantially organic solvent-free aqueous titania sol solution, titania gel, or titania sol-gel mixture in a closed vessel under pressure; and~~

~~then drying the treated product to prepare anatase titanium oxide powder.~~

9. A process for producing anatase titanium oxide, comprising the steps of:

~~heat treating a substantially organic solvent-free aqueous titania sol solution, titania gel, or titania sol-gel mixture in a closed vessel under pressure; and~~

~~then stirring or ultrasonically dispersing the treated product to prepare aqueous anatase titanium oxide slurry.~~

10. The process for producing anatase titanium oxide according to claim 8 or 9, wherein the substantially organic solvent-free aqueous titania sol solution, titania gel, or titania sol-gel mixture is heat treated in the temperature range of 120 to 270°C in the closed vessel.

11. The process for producing anatase titanium oxide according to any one of claims 8 to 10, wherein the contents of the closed vessel are heated to evaporate the solvent contained in the substantially organic solvent-free aqueous titania sol solution, titania gel, or titania sol-gel mixture, whereby the inside of the closed vessel is pressurized at a pressure of 1.5 to 33 atm by gas generated as a result of the evaporation of the solvent.

12. The process for producing anatase titanium oxide according to any one of claims 8 to 11, wherein a titanium alkoxide

is provided as a starting material for the production of a substantially organic solvent-free aqueous titania sol solution, titania gel, or titania sol-gel mixture and is hydrolyzed in aqueous hydrogen peroxide or aqueous ozone and, at the same time, is dissolved in aqueous hydrogen peroxide or aqueous ozone to produce a substantially organic solvent-free aqueous titania sol solution, titania gel, or titania sol-gel mixture.

13. The process for producing anatase titanium oxide according to any one of claims 8 to 12, wherein at least one member selected from the group consisting of water-soluble metal salts, acidic materials, alkaline materials, organic polymers, inorganic materials, and metal alkoxides other than titanium alkoxides is added to the substantially organic solvent-free aqueous titania sol solution, titania gel, or titania sol-gel mixture.

14. The process for producing anatase titanium oxide according to any one of claims 8 to 13, wherein inert gas is introduced into the closed vessel to pressurize the inside of the closed vessel.

15. A process for producing a titanium oxide coating material, comprising the steps of:

providing a titania sol solution, a titania gel, or a titania sol-gel mixture; and

treating the titania sol solution, the titania gel, or the titania sol-gel mixture with ozone gas to produce a titanium oxide coating material.

16. The process for producing a titanium oxide coating material according to claim 15, wherein water, an organic solvent, or a mixture thereof is incorporated as a solvent into the titania sol solution, the titania gel, or the titania sol-gel mixture.

17. The process for producing a titanium oxide coating material according to claim 15 or 16, wherein the titanium oxide coating material produced by treating the titania sol solution, the titania gel, or the titania sol-gel mixture with ozone gas is further diluted with an organic solvent.

18. The process for producing a titanium oxide coating material according to any one of claims 15 to 17, wherein the

titania sol solution, the titania gel, or the titania sol-gel mixture is treated with ozone gas and at least one member selected from the group consisting of titanium oxide powder, titanium oxide slurry, and a mixture thereof is mixed with the treated product to produce a titanium oxide coating material.

19. The process for producing a titanium oxide coating material according to any one of claims 15 to 18, wherein at least one member selected from the group consisting of acidic materials, alkaline materials, surfactants, and metal alkoxides other than titanium alkoxides is added to the titania sol solution, the titania gel, or the titania sol-gel mixture.

SJ
A3